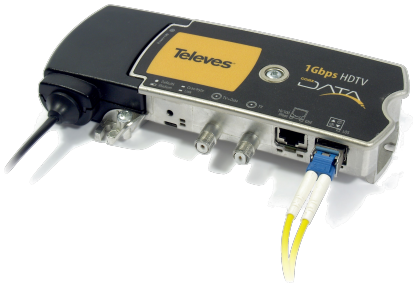
Televes®

Ref.769201 CoaxData™
1Gbps HDTV



Ref.769202 CoaxData™
1Gbps HDTV con SFP

Ref.769203 CoaxData™
1Gbps HDTV 1xEth

coax DATA 1Gbps HDTV

EN

Ref.769201/769202/769203 CoaxData™ 1Gbps

Manual de Usuario

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Important safety instructions

General installation conditions

- Before handling or connecting the equipment,please read this manual.
- In order to reduce the risk of fire or electric shock, do not expose the equipment to rain or moisture.
- Do not take the cover off the equipment without disconnecting it from the AC power.
- Do not obstruct the equipment's ventilation system.
- Please allow air circulation around the equipment.
- The equipment must not come into contact with water or even be splashed by liquids. Do not place containers with water on or near the equipment if it is not adequately protected.
- Do not place the equipment near sources of heat or in excessively moisture conditions.
- Do not place the equipment where it may be affected by strong vibrations or knocks.

How to use the equipment safely

- The powering supply of this product is: 108-254 Vac~ 50/60 Hz.
- If any liquid or object falls inside the equipment, please contact a specialized technician.
- To disconnect the equipment from the mains, pull from the connector, and never pull from the cable.
- Do not connect the equipment to the mains until all the other connections have been made.
- The AC Power socket that is going to be used to connect the equipment should be located nearby and should be easily accessible.

Electrical safety symbols

This symbol indicates compliance with the requirements of CE mark.

This symbol indicates that the equipment is for indoor use only.

This symbol indicates that the equipment complies with the safety requirements for class II equipment.

Introduction

Modem Ethernet over Coaxial. CoaxDATA 1Gbps-HDTV

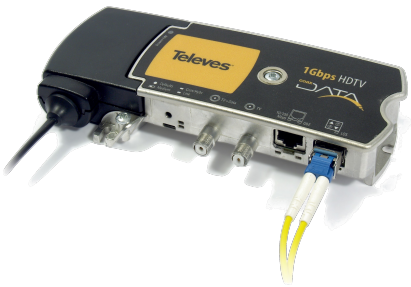
The **CoaxData 1Gbps-HDTV** can transmit IP data over coaxial cable installations with coexistence of TV channels or other existing services. The Coaxial Ethernet modem immediately connects multiple PCs on the coaxial network or powerline on your home, hotel or buildings without additional cabling. Televes provides two variants of product:

The **Ref.769201 CoaxData™ 1Gbps-HDTV** incorporates power supply, two "F" connectors for TV and data connectors and two RJ-45 Ethernet 1000BASE-T/100BASE-TX/10BASE-T

The **Ref.769202 CoaxData™ 1Gbps-HDTV** incorporates an Ethernet 1000BASE-/100BASE-TX/ 10BASE-T and a SFP (According to MSA INF-8074i specification of the SFF Committee). This connector allows you to use Gigabit modules 1000BASE-LX/1000BASE-SX/ 1000BASE-CX or built-in SFP devices that support new protocols like EPON (IEEE 802.3ah) or GPON (ITU G.984) to CoaxData integration in fiber optic networks.

The **Ref.769203 CoaxDATA™ 1Gbps-HDTV 1xETH** incorporates power supply, two "F" connectors for TV and data connectors and one RJ-45 Ethernet 1000BASE-T/100BASE-TX/10BASE-T. Only supports coaxial medium.

Ref.769201 CoaxData™ 1Gbps HDTV



Ref.769202 CoaxData™ 1Gbps HDTV con SFP

Ref.769203 CoaxData™ 1Gbps HDTV 1xEth

Main Features

- Connect your computer to the Internet access services, using existing wiring in your building.
- Easy installation, no need to open the computer or install any software driver.
- 2xLED to indicate the status of the modem.
- **2xEthernet** (Ref.769201) or **1xEthernet** (Ref.769202 or 769203) 1000 BASE-T/100 BASE-TX/ 10 BASE-T to allow connection to multiple computers in your home to Gigabit speeds: PC, game console, printer, STB (Set-top Box).
- **1xSFP** (Ref.769202) de 1Gigabit that enables the connection of modules plugables fiber optic or copper network to extend the data.
- IEEE 1901 Compliant with HomePlug AV PHY that supports **2880 OFDM carriers** with 4096/1024/ 256/64/16/8 QAM, QPSK, BPSK and ROBO mode capable of transmitting up to **700 Mbps** and up to **350 Mbps** physical rate of rate UDP over coax.
- Operating bandwith in the return channel **2 to 67,5 MHz** with a **maximum attenuation of 85 dB** supported. No requirement of minimum attenuation. Reach distances **greater than 1km**

away.

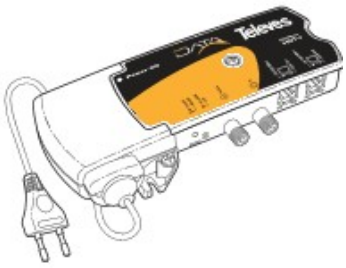
- Dynamic adaptation to the channel conditions and powerful coding system with automatic error correction techniques based on **FEC** (forward error correction) and **TCC** (convolutional turbo codes) that enables the transmission/reception of signals with a minimum SNR of only 3 dB.
- **Advanced encryption** (AES-128) to ensure security for their communications and private networking no other user can use the same network.
- Sharing access to high speed Internet. Connect **up to 253 modems** in its distribution network. No hubs or switches are required. Data travels on the chosen cable installation.
- Supports **Quality of Service (QoS)** and incorporates packet classification rules and multiple transmission queues.
- Supports IGMPv3 multicast management streams for efficient implementation of IPTV or VoIP systems, allowing the management of up to 32 different channels.
- AC Power Supply 108-254Vac~ 50/60Hz on the device and low power mode to save energy by consuming less than 2 watts.
- Configuration software Toolkit.
- Compact and robust design that meets all legal regulations applicable to product safety (EN 60950-1:2007 / AC: 2012), to interference requirements (EN 55022:2008), immunity (UNE-EN 55024:2011) and limits of electromagnetic radiation in electrical wiring systems (EN 50412-2-1:2006).

System Requirements

- PC or laptop with an Ethernet interface.
- Plug & Play System and no requires installation of any software or additional driver.

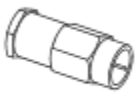
CoaxData 1Gbps-HDTV Package Contents

- Ref.769201/Ref.769202/ Ref.769203 CoaxData 1Gbps-HDTV
- Users Quick Install Guide
- 75Ohm RF Load.



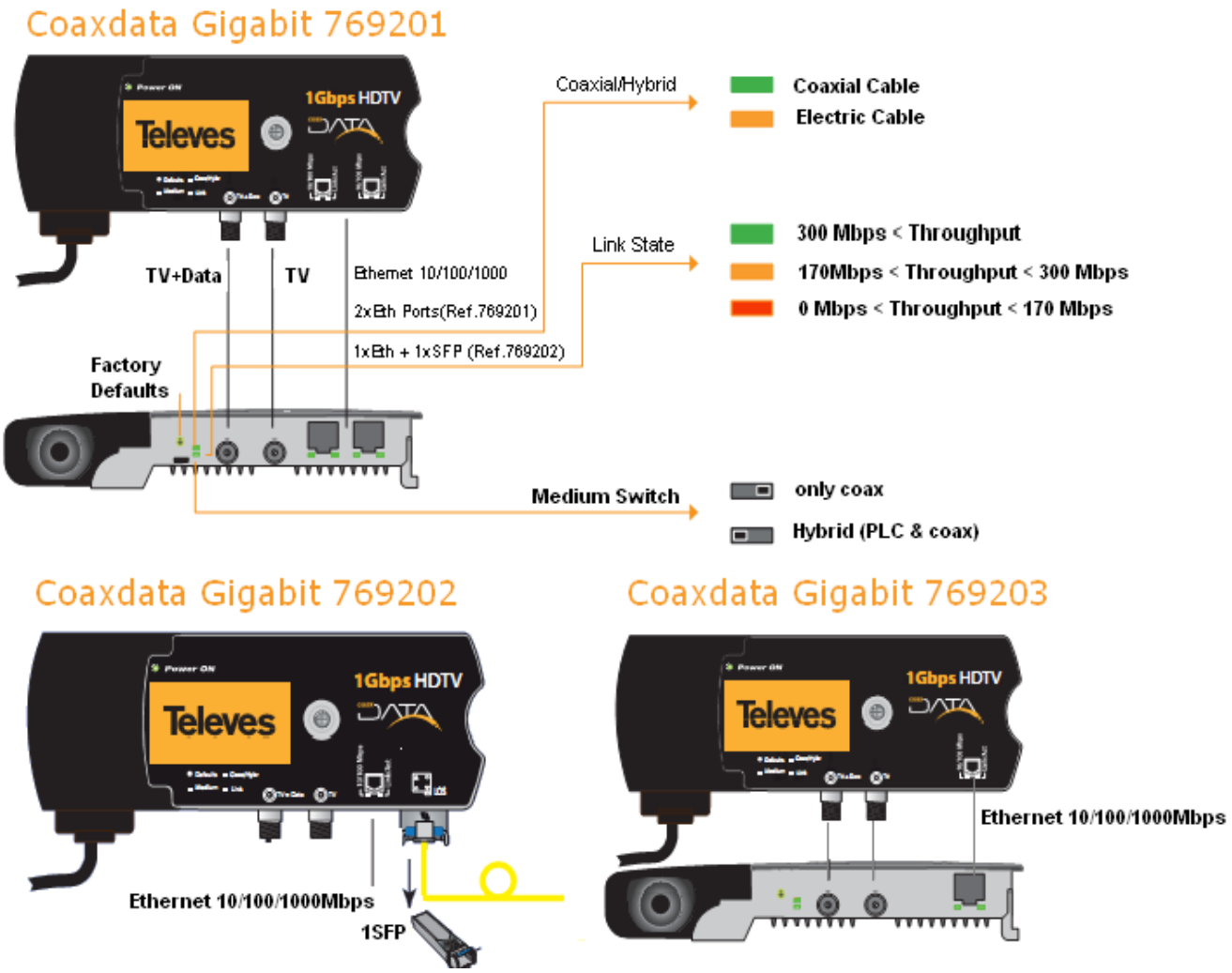
CoaxDATA 1Gbps-HDTV Adapter

Quick Install Guide



75Ohm RF Load

Knowing CoaxData 1Gbps HDTV



Adapter Interfaces

Ethernet Ports

2xEthernet RJ-45 Ports (Ref.769201) or 1xEthernet RJ-45 Port (Ref.769202, Ref.769203) 10BASE-T/ 100BASE-TX/1000BASE-T standards-compliant that connect CoaxData 1Gbps-HDTV to your PC or laptop. With a second connector for an additional connection to another device: VoIP phones, set top boxes, televisions, etc.. Autonegotiation features for maximum link speed and Auto-MDIX which avoids the use of Ethernet crossover cable.

SFP Port (Only 769202)

Ref.769202 replaces one Ethernet for an SFP. This connector allows the use of singlemode/multimode fiber modules compliant with1000BASE-LX/1000BASE-SX/1000BASE-CX standards or or SFP devices built-in modules that support new standard protocols like EPON(IEEE 802.3ah) or GPON (ITU G.984) to integrate CoaxDATA in optical fiber networks.

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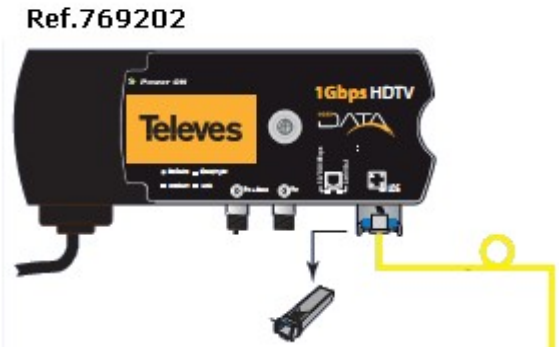

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Data Input. TV + Data

Input F female connector for data and TV, directly from the TV outlet.

Output TV. TV

Output F female connector for TV services and channels.

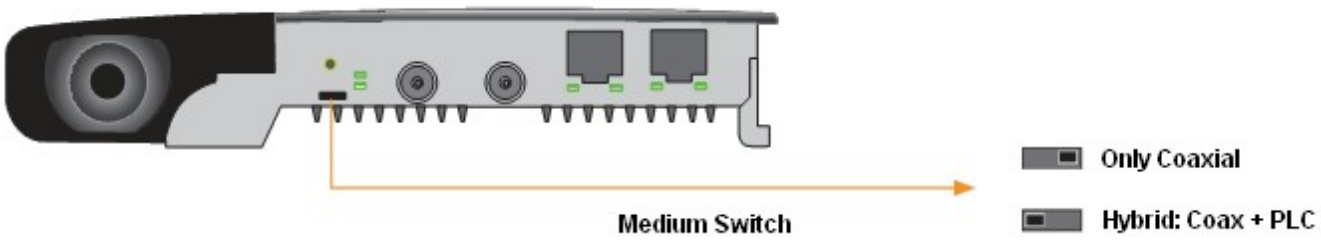
Factory Defaults Button (Factory Settings)

Pressing Factory Defaults button on the front of device at least three seconds, that the modem will load the default configuration from the factory.

- Factory default button delete all user configuration and set default factory configuration. Be careful when using this button because if modems are configured on MxU mode, this button will remove that setting and set defaults operating mode HomeNetworking.
- CoaxManager™ Advanced Features can disable factory button so that user settings cannot remove when press button

Medium Switch

On the front is a switch to switch between only coaxial medium (right) and hybrid mode (left) where signal is transmited on coaxial and powerline mediums. Signal is always transmitted on the coaxial.

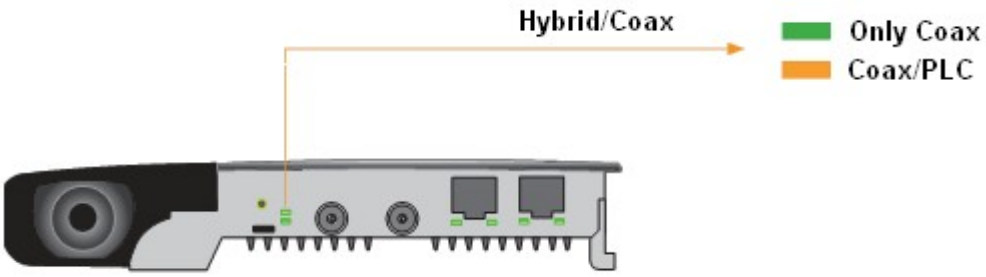


Adapter LEDs

Hybrid/Coaxial Medium LED

LED indicating the selected transmission medium through the front switch

- Coaxial: Green. Only connected via coaxial cable
- Hybrid: Orange. Connected to both coaxial media + PLC.



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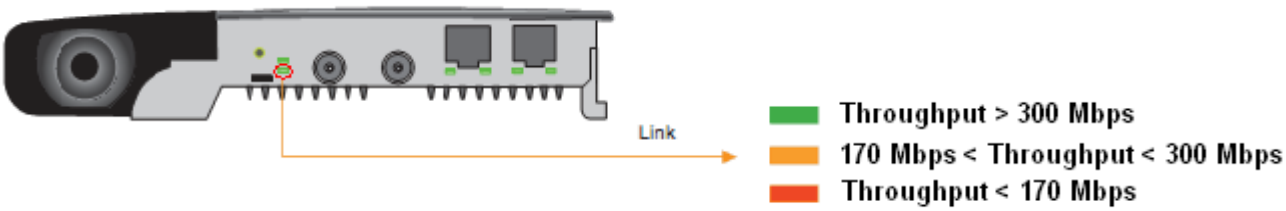
Link State LED

tri-color LED(green/orange/red) that perform a dual role: on one hand led will light if established connectivity with another device on the other led flash indicating activity in data transmission.

The color of the LED indicates the link quality.

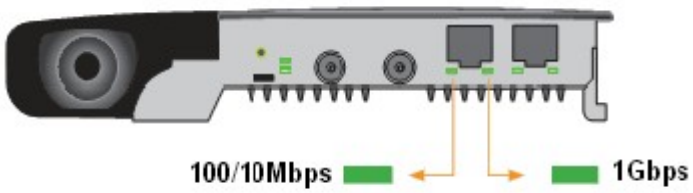
- Green: Link to full speed. Optimal Communication.
- Orange: Link acceptable but not optimal.
- Red: Poor link performance, even though the device can transmit high speed rates.



Ethernet State LED

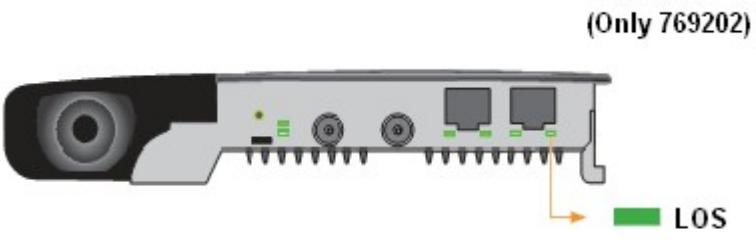
This LED will light when an Ethernet link is established and will blink when transmitting data. Autonegotiation feature is used to link with highest speed as possible. Included are two LEDs:

- 1Gbps: When link speed is 1Gbps after autonegotiation.
- 100/10Mbps: When link speed is 100/10Mbps after autonegotiation.



SFP State LED (Only 769202)

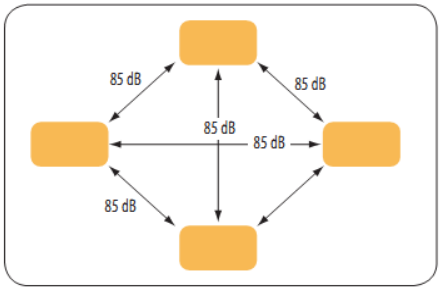
- **LOS (Light optical signal):** LED light when the SFP received optical laser signal through optical fiber. With this LED can check if, after fiber installation, work is well done and signal arrived correctly to SFP module.



Setting Modem operating mode

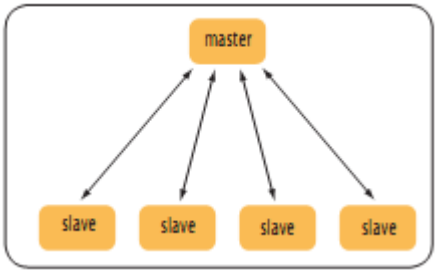
Operating mode can be set by CoaxManager™ management/control features. CoaxDATA Modem has two operating modes depending on the type of network you want to create:

- **Home Networking**: This operation mode is set at the factory and allows the creation of a local area network where all devices communicate with each other. These networks are usually created when the modem is used to extend internet services within a house. This mode is Modem defaults and can be set anytime pressing Defaults button on the front of device.



Multipoint-To-Multipoint

- **MDU/MTU (Multi-Dwelling/Multi-Tenant Unit)**. This mode uses existent coaxial network on building or house from the headend to communicate with coax outlets and provide access to multiple dwellings avoiding communicate with each other. In this mode have two elements:

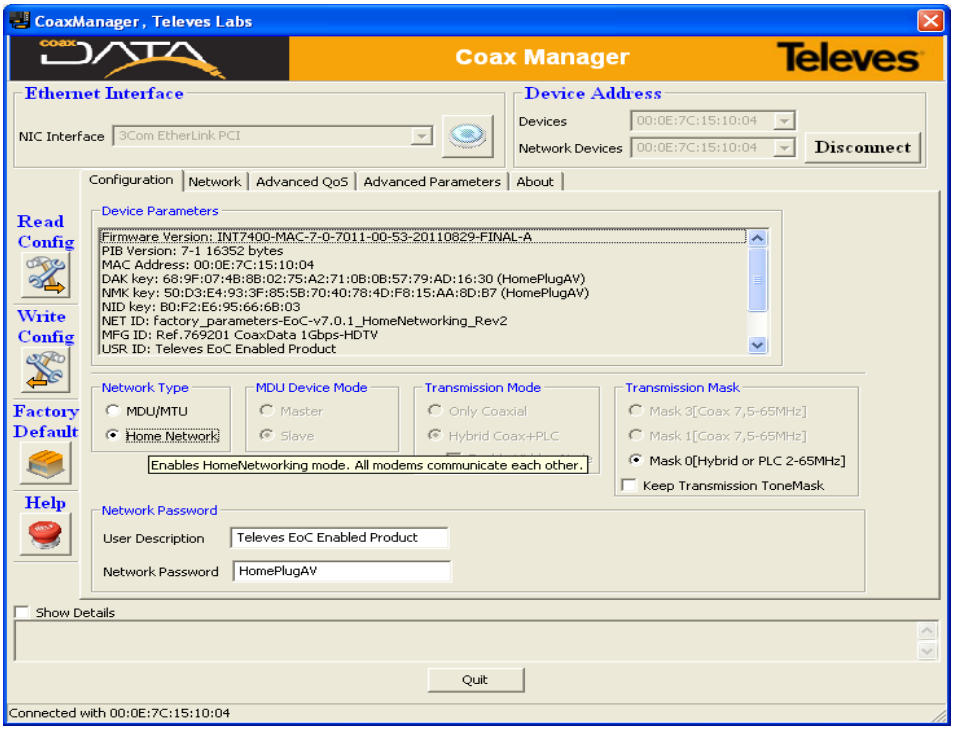


  - **MDU Master**: Typically installed at the distribution headend, manages all network elements and can be plugged to an ADSL modem or any other device provided by ISP (Internet Service Provider) to connect to the Internet.
  - **MDU Slave**: Installed in each of coax outlets provides the access points for user data.

These operating modes are set by CoaxManager Software.

In the Configuration tab, you can set whether or not to enable the MDU and if mode of operation is master or slave.

You can also indicate transmission medium the connection is made, only coaxial or hybrid network (Coaxial + Electrical).



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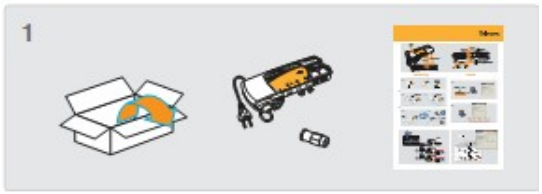
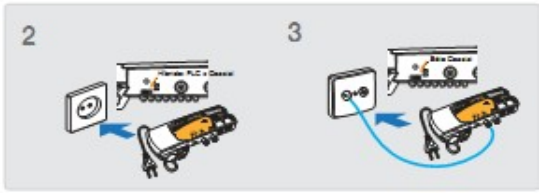
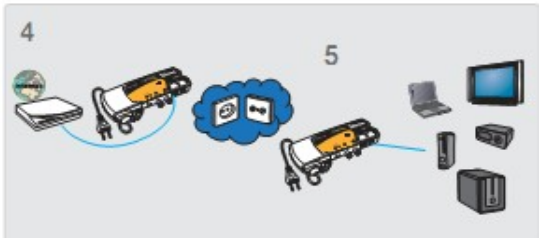
HomeNetworking Installation of CoaxData 1Gps-HDTV

CoaxData HDTV 1Gbps adapter is configured to create a HomeNetworking plug-and-play network. This mode creates a LAN and enabling all devices to communicate with each other (peer-to-peer).







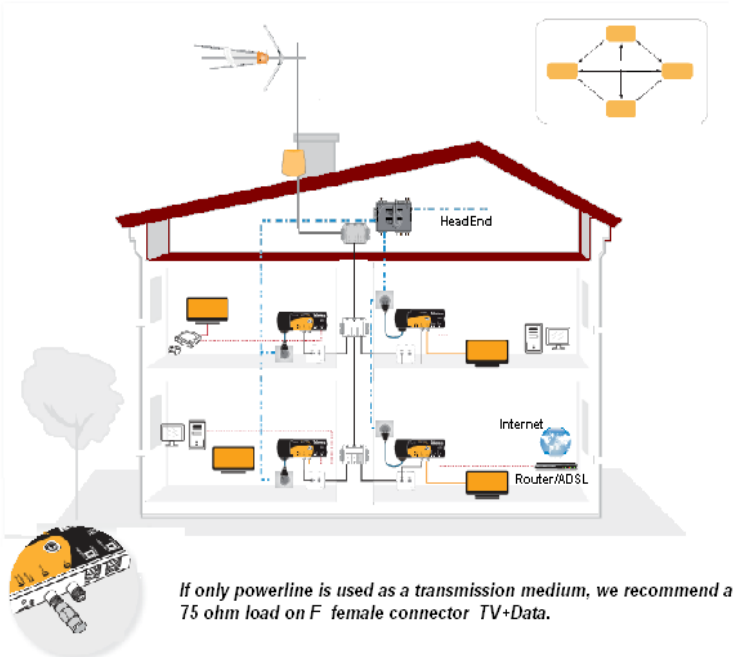
After unpacking the product (1), quick install consists of a medium selection by which to create the network. Only can be well Coaxial (3) or by a hybrid output (2), ie can transmit on both Coaxial and electrical network, enabling communication between modems through coaxial outlets or power sockets of house.

Connect modems to devices demmanding internet access such as set-top boxes, printers and PCs, using an Ethernet cable.

In a typical installation of Internet access, one modem is connected to the Internet Router Operator (4) and other modems to get internet access (5).

- *CoaxManager™ modes (Only Coaxial / Hybrid), must correspond with medium switch selection on the front of device*

Figure shows Plug&Play HomeNetworking installation, where 1Gbps CoaxData HDTV modems are set on hybrid mode, enabling intercommunication between all modems either coaxial or by powerline. Thus, it becomes possible to extend the network to the dwelling places where there is a Coaxial outlet or plug socket.



If only powerline is used as a transmission medium, we recommend a 75 ohm load on F female connector TV+Data.

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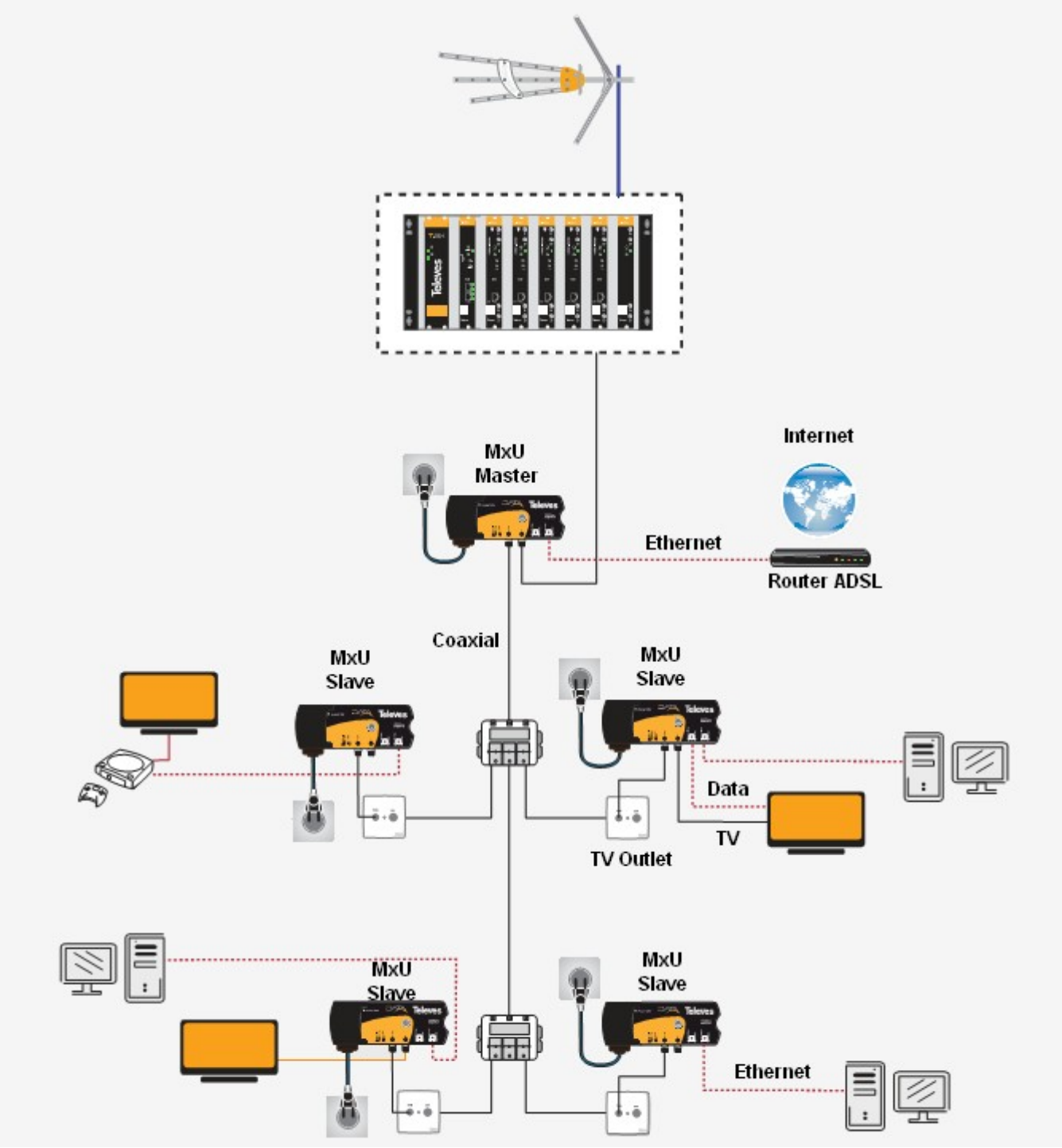
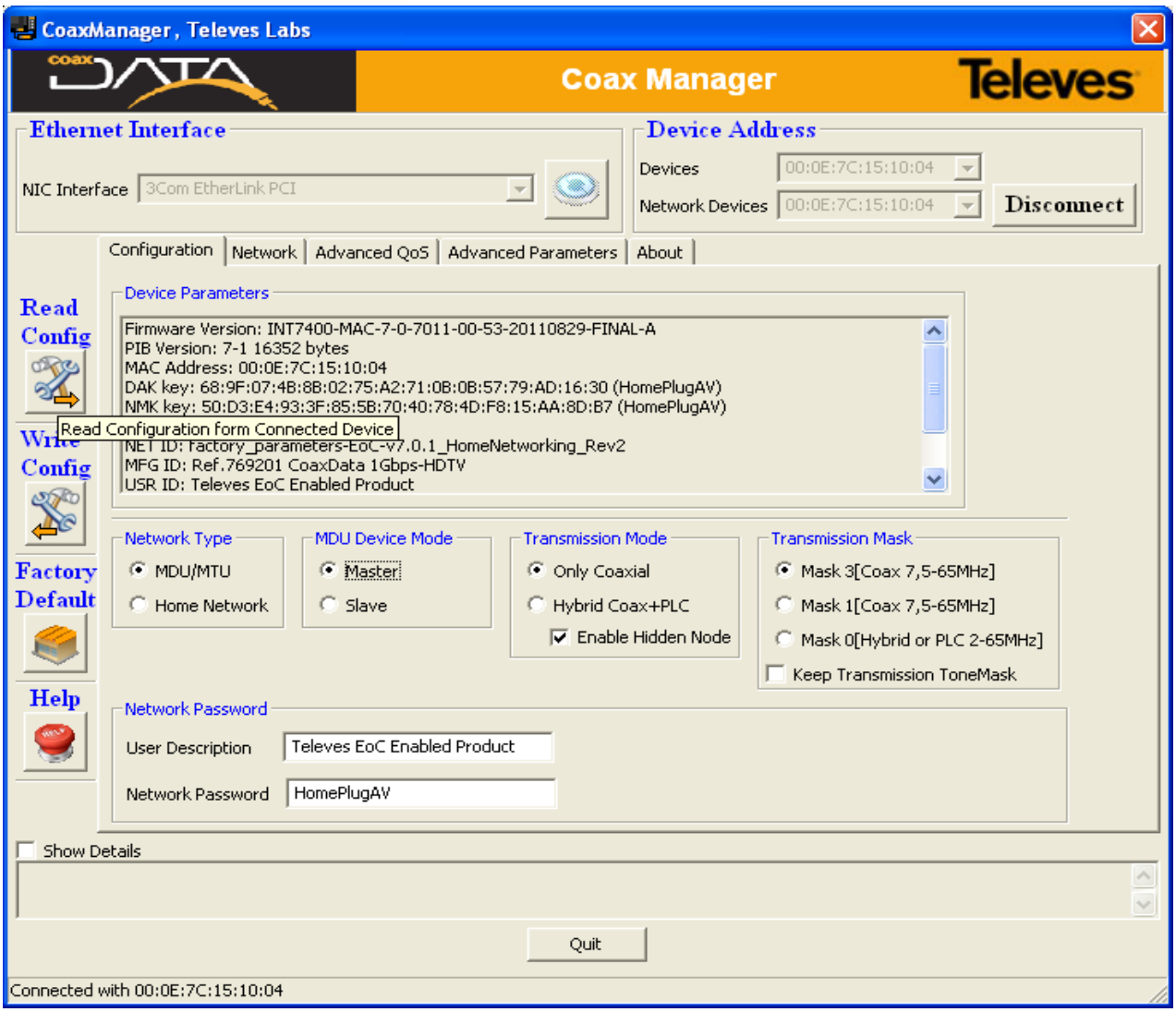
MDU/MxU Installation of CoaxData 1Gps-HDTV

The figure below shows a schematic of how to connect the CoaxData 1Gbps-HDTV to header installation (MDU Master), to distribute the available data services: Internet, Video Streaming, VoIP to dwellings (MDU Slave):



Setting Master on Distribution Headend

In order to create a data network in the building is necessary set MxU Master mode on device installed on headend. Master mode is set with CoaxManager.



Connect Master to Coaxial Headend

Master Installed on headend establishes two connections:

- **Internet Connection**: To connect master modem to ISP provider is necessary to have a DSL router, Docsis cable modem or similar devices which provide Internet access. Usually you need a class Ethernet cable CAT-5 or CAT-6.

- **Connect to Coaxial Network**: You should connect master to coax network through a internal diplexer filter of coaxData devices that suppresses interfering noise of coaxial header. Diplexer function mixes TV and data signals with a minimal loss (<1dB) removing possible noise in the working band (2 to 67,5 MHz) generated from the head. This connection is made through a female connector "F".

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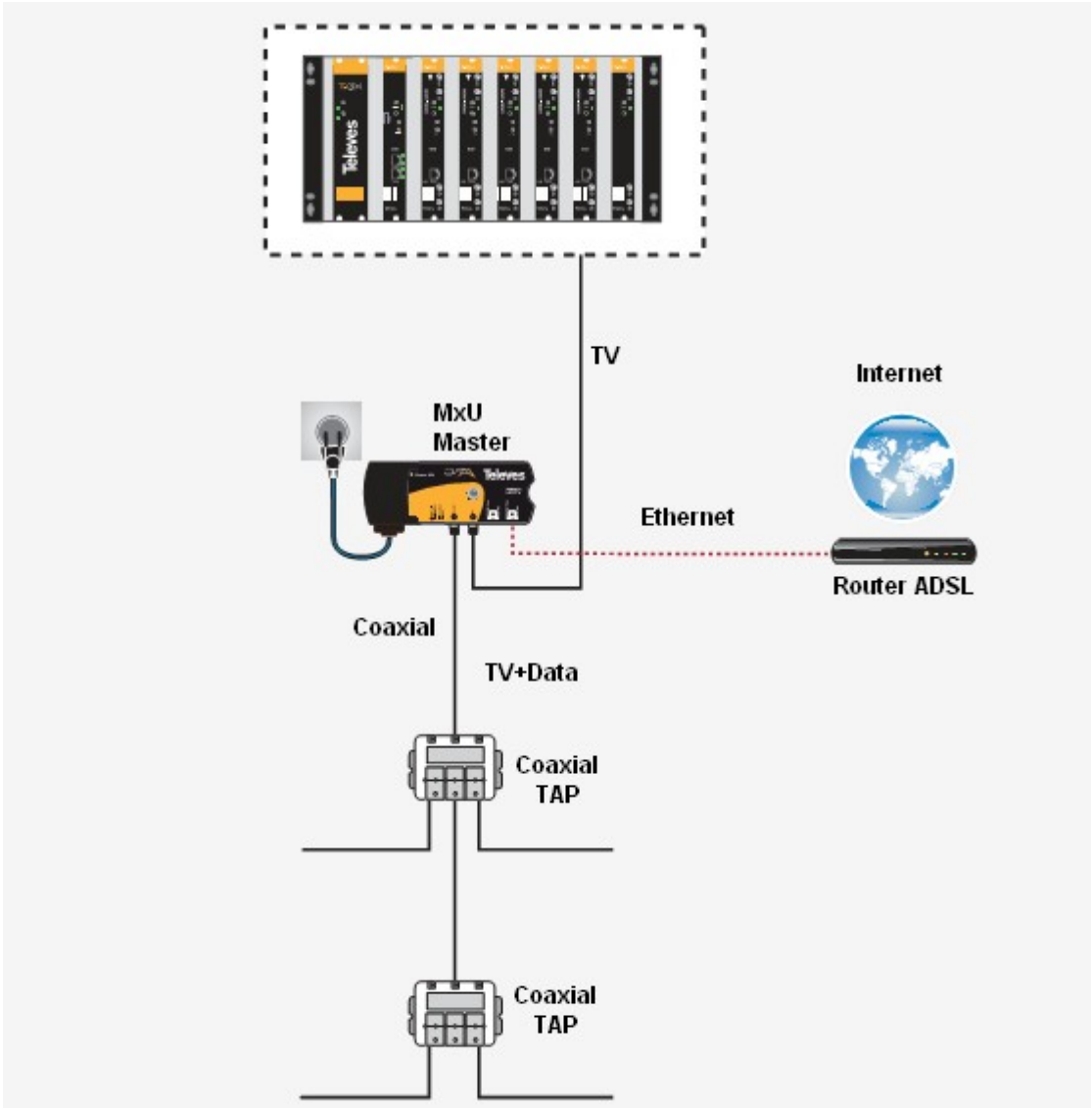


Connect Slave to Coaxial Outlets

Following instructions show how to connect CoaxData 1Gbps HDTV from your PC to coaxial socket. Once installed you can connect directly to the network interface of your PC without any drivers or software:

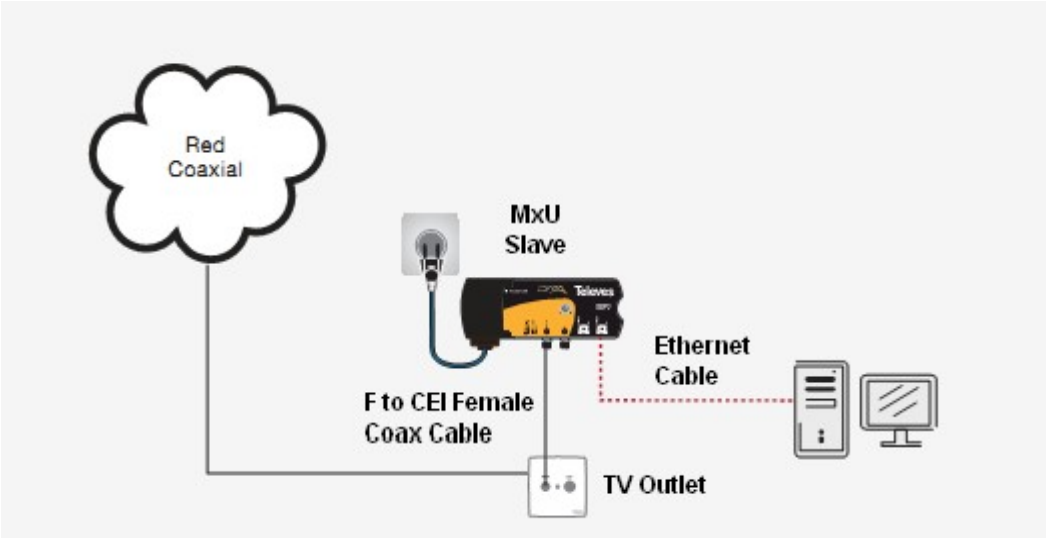
- **Select Operating mode Master/Slave**: Operating mode Master / Slave: To create data network it is necessary that one of the modems operate in master mode, which will be installed at the head, the rest of the modems will be installed in the sockets and must be configured in slave mode by CoaxManager.

- **Connect Modem to PC**: CoaxData 1Gbps-HDTV is equipped with two connectors that support Ethernet 1000/100/10 Mbps speeds with auto-negotiation enabled, which allows to reach the maximum possible speed, and incorporates MDI-X function which avoids the use crossover cables.

  - Connect one end of the Ethernet cable to an CoaxDATA Ethernet port.
  - Connect the other end to an PC or laptop Ethernet port.

- **Connect Modem to CEI Coaxial Socket:** Typically coaxial network distribution ends on a CEI Outlet TV. To connect modem to outlet follow next steps.
  - Connect CEI Female coaxial cable end to CEI male connector of TV Outlet.
  - Connect CEI Male cable end to modem TV+Data input, F connector, via an CEI-M to F adapter.

If device is properly connected to coaxial, LED "Coaxial Link Status" must light on permanently on slaves and master. In the case Link Status is off when connect modem check connections and verify coax installation.



Now your PC is connected to coaxial data network through TV distribution!

Consider the characteristics of your network Coaxial:

- All Coaxial network elements must support working band **2 to 67,5 MHz** This includes items such as outlets, taps, splitters and line amplifiers.
- Maximum coaxial attenuation between header and outlet should not exceed **85 dB** in working channel: **2 to 67,5 MHz**
- Modem comes with tools for rapid assessment of data network state once installed.

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Application Examples - Home Networking

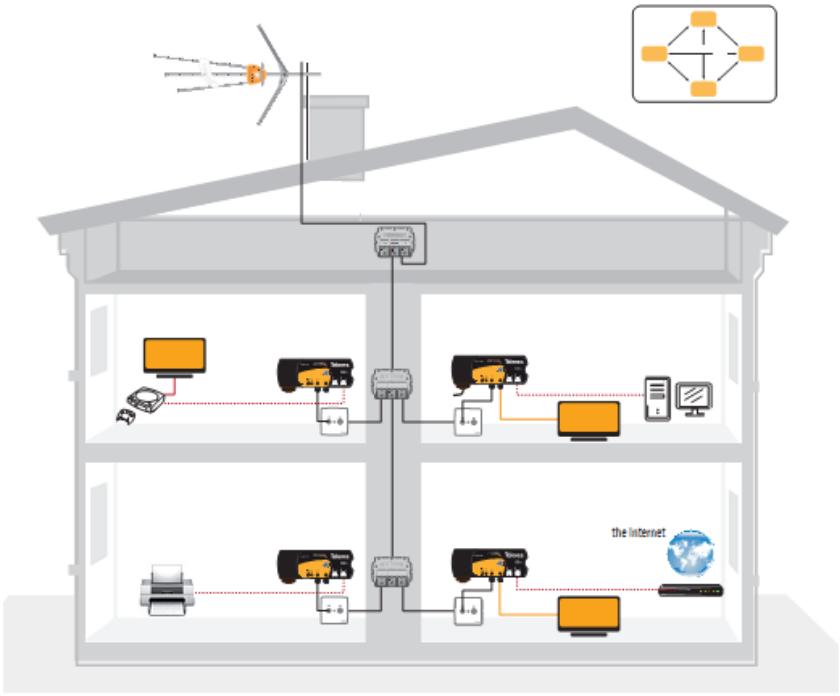
Home Netwoking - Coaxial Option

BASIC INSTALLATION

One of the most typical applications CoaxData modem is using it to share the services of an Internet provider at home.

Using the modem, you will have access to services provided by the Internet service provider (ISP), such as Internet access, "streaming" video or VoIP in whole installation without additional infrastructure.

The following diagram shows a typical installation in which a user can access the different services offered by the Internet, anywhere in the casa.Tambien can share printers and multimedia servers located in other rooms.



Shared Printers, NAS Server, Internet, ..., on same network

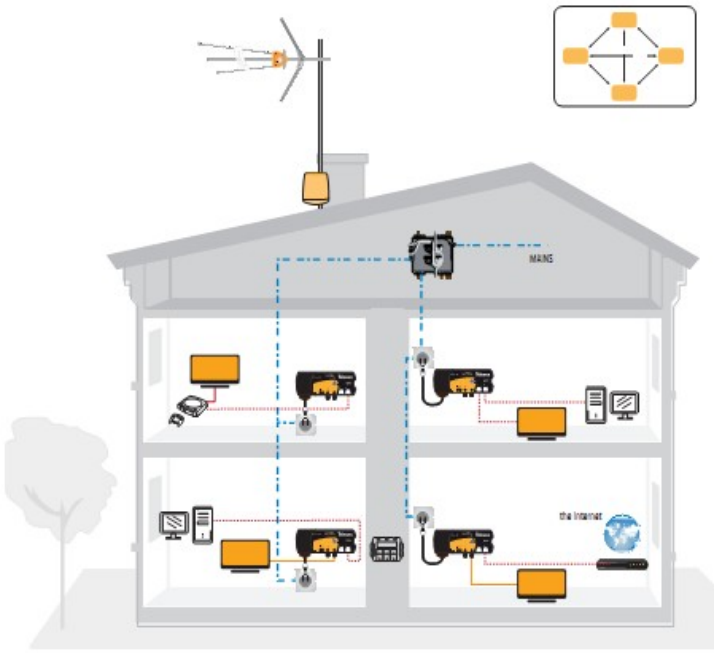
Home Networking - PLC Option

BASIC INSTALLATION

CoaxData allows create local network through the powerline grid infrastructure (PLC).

The main advantage of this application is based on the fact that the electricity network reaches every corner of the house.

Thus CoaxData transforms an electrical outlet in a data access point.



Home Networking - Hybrid Option

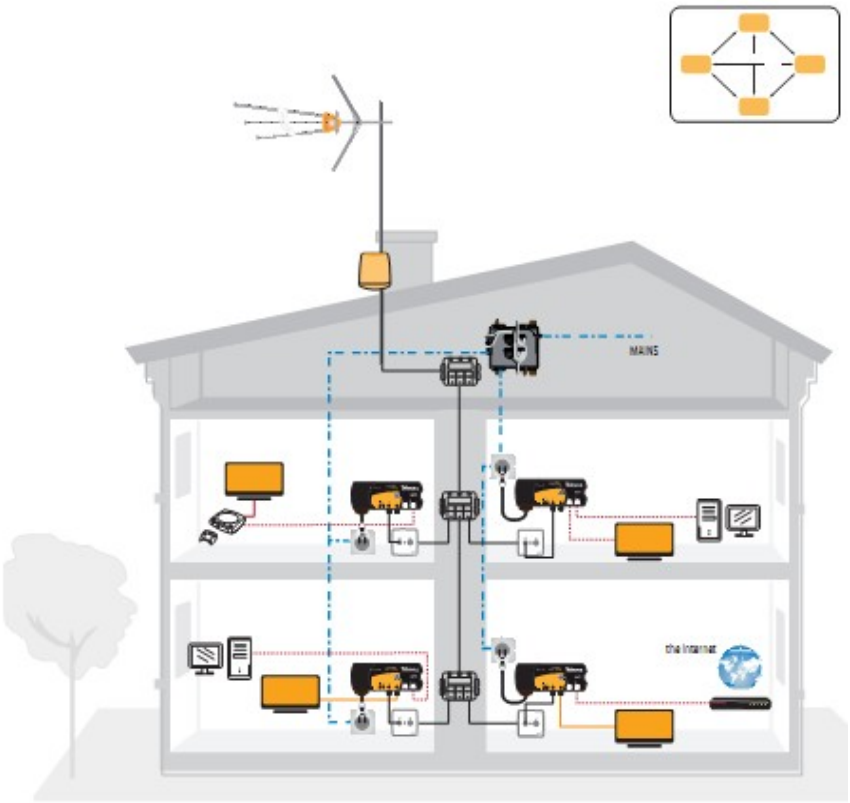
BASIC INSTALLATION

CoaxData adapter is factory configured to perform a plug-and-play home network.

This allows the creation of a LAN, where all devices communicate with each other ("peer-to-peer" P2P).

This application is used both household infrastructure, coaxial cable and power cord for data transmission (COAXIAL + PLC).

So any TV outlet or plug power can be an access point to the LAN.



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Application Examples - Shared Networks in Buildings

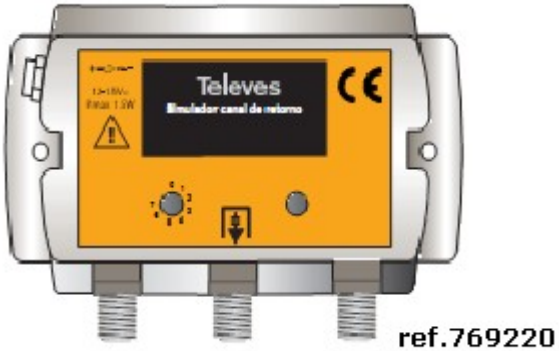
Shared Networks- Cheking Coaxial Cable

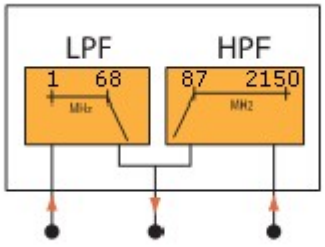
Before dealing with any shared network to provide the ability to distribute data using CoaxData modem, you must know whether the network has its return channel in optimal state.

This requires the following equipment:

- Advanced coaxial network analyzer to measure the noise in the return channel as Televes H45 or H60 spectrum analyzers.
- Signal Noise Generator ref.5930
- CoaxData Gigabit Diplexer filter: ref.769220: Data (2-65Mhz) and TV (87-2150Mhz)

Signal Noise Generator ref.5930





CoaxData Gigabit Diplexer filter ref.769220

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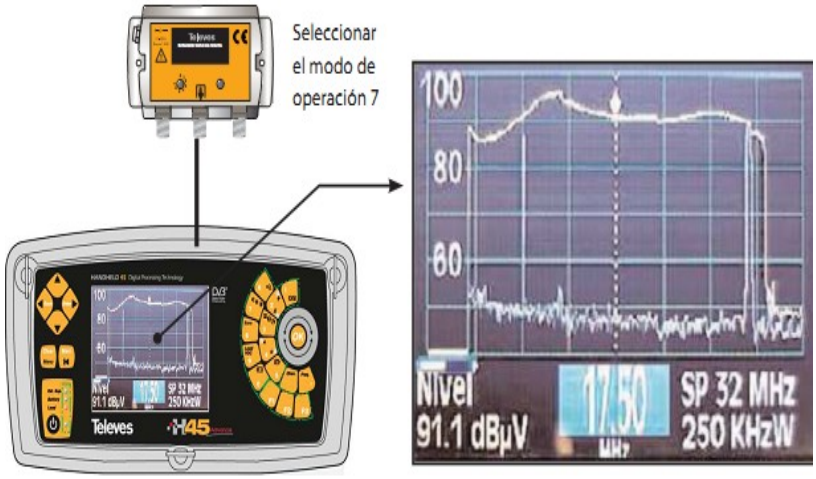
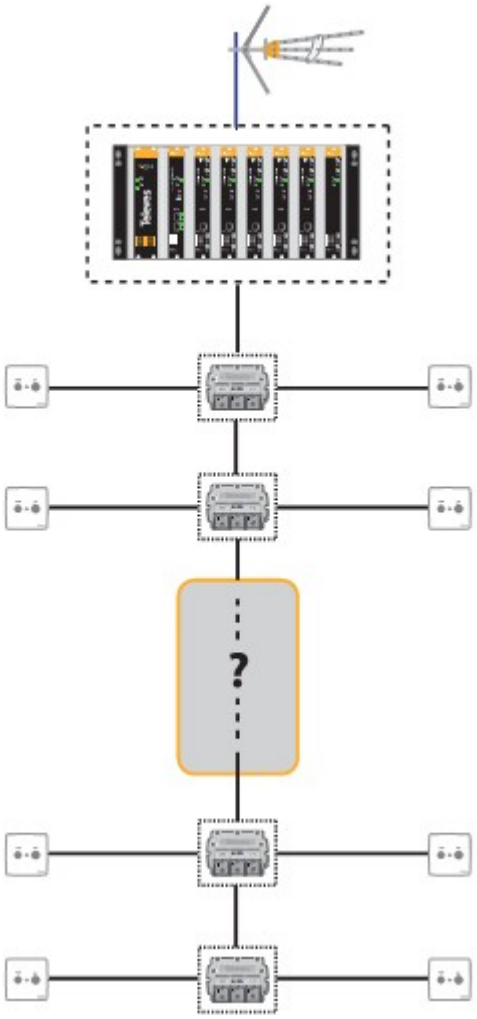
Step 0 ref.5930 Signal Measure: First step is check output of signal noise generator ref.5930 with H45/H60 meter and save the measure as a comparative reference for measurements to be made later (Step 4).



After measuring signal level as reference, it has to measure the noise level in the coaxial network in folowing steps.

Step 1 HeadEnd Noise Measure: Disconnect the headend and check the amount of noise generated in the return path from 5-30 MHz, make sure that there is more than 50 dBuV.

If readings exceed noise limits above, it is necessary to use a diplexer filter to avoid noise interference on headend: ref.769220, for example.



Step 2 Coaxial Network Noise Measure: Then do the same measure, but this time with the distribution network. This is done by connecting the input H45/H60 to distribution network and checking that the noise generated by all elements in the 5-30 MHz return channel never exceeds 25dBµV.

If the measurement exceeds the reference value 25dBuV, must identify that point of the distribution network cause excess noise in the return channel. Typically device connected to any outlet.

Step 3 Coax Network Attenuation with signal generator: With level reference obtained in Step 0, check the attenuation of distribution network in the return channel between the input of the distribution network and the worst case of all CoaxDATA connection points. Must be equal or less than 85 dB.

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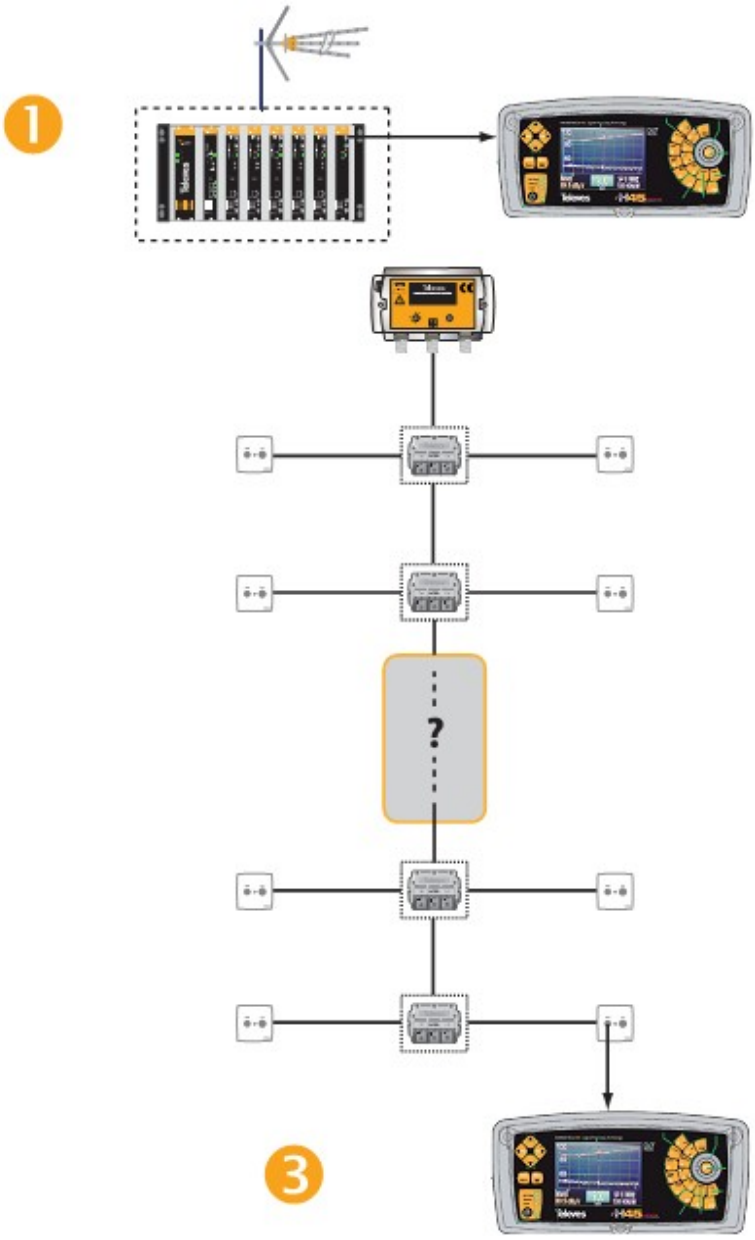
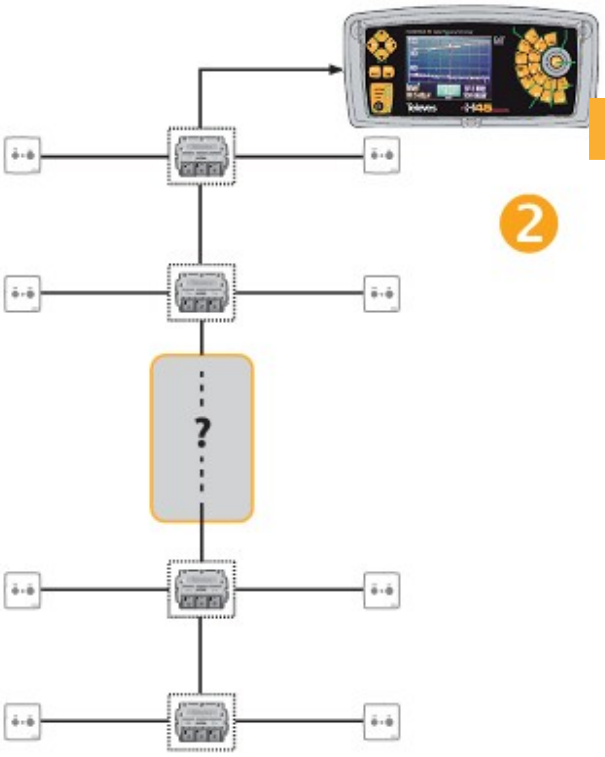


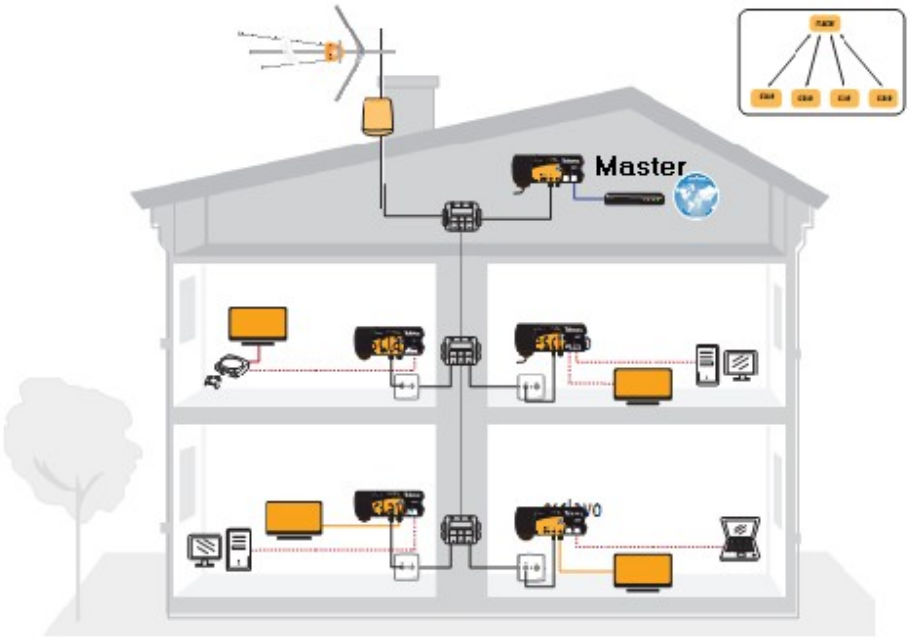


Shared Networks - Basic Installation

Working Example

On Share Network installation one modem is set to MxU Master mode, who controls traffic flow between slaves.

CoaxDATA AccessControl™ software can enable or disable any of the network CoaxData adapters.



Shared Network - Several Masters in Coaxial Header

How use multiple masters in a header?

There are two typical coaxial architectures:

- **Star Topology:** Several Coaxial Downpipes on same building. When coaxial distribution is in star topology, you can install multiple masters at the head of the coaxial network, Each master serves a physically separate coaxial subnet.
- **Tree Topology:** Only one downpipe on coaxial building. All coaxial elements shares same infraestructure. When coax distribution is in tree topology several masters exists on same coaxial. Every master create a Associated Logical Virtual Network (shorted AVLN) and can manage their associated slaves. This architecture requires different network password for each AVLN to identify them.

On Star Topology, installation of several masters in different branches of coaxial infraestructure increases the effective data rate that is capable of supporting network, and each network, in which data is created in a separate coaxial distribution, thereby increasing the overall system capacity, facilitating the development video streaming or IPTV.

- Masters installed in the header need not be configured with a different network password since they operate separately on each branch of coaxial distribution systems.
- To increase isolation between these modems masters, use diplexer filter ref.769220 to mix TV and data signals.

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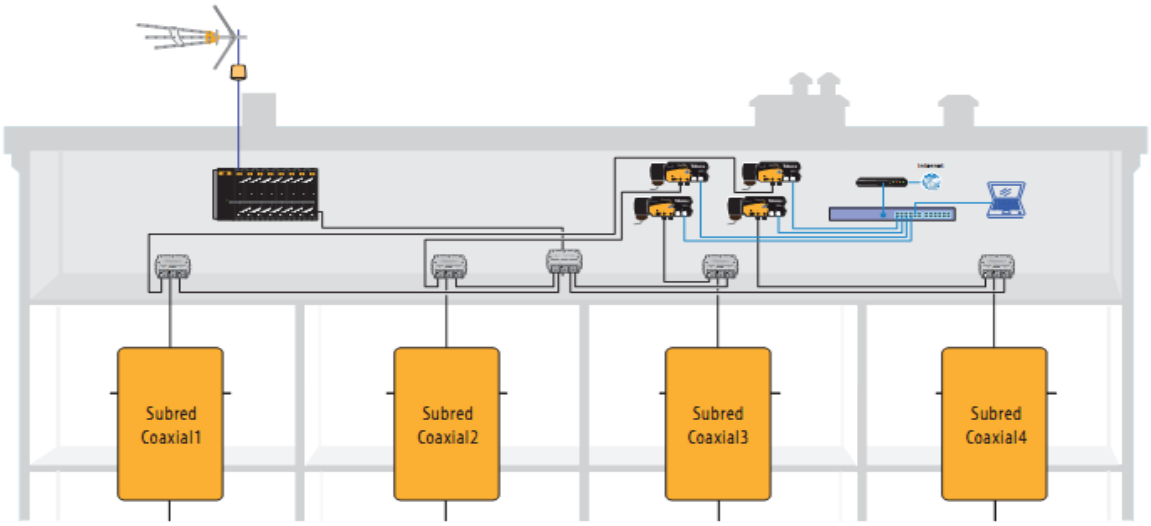

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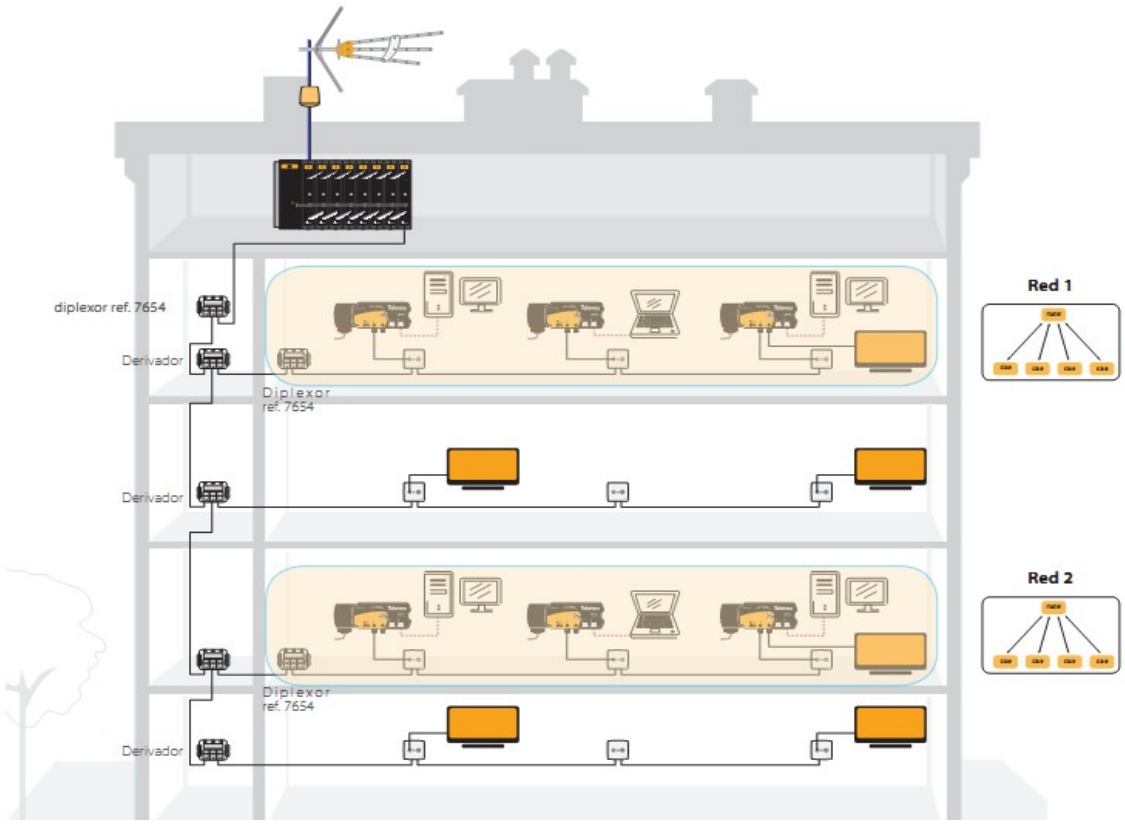
How to do individual home networks in each building dwelling?

In this installation scheme aims to create a home network in each of building dwelling.

To perform these individual networks need to ensure a high isolation avoiding interference between adjacent networks using diplex filters.

Installing ref.769220 diplexer filter on coaxial input on each home prevents neighboring networks interference with each other and header noise interfere with data and decreases link quality. Diplexers filters determine master network range and also allows installation of multiple networks within a building or house.



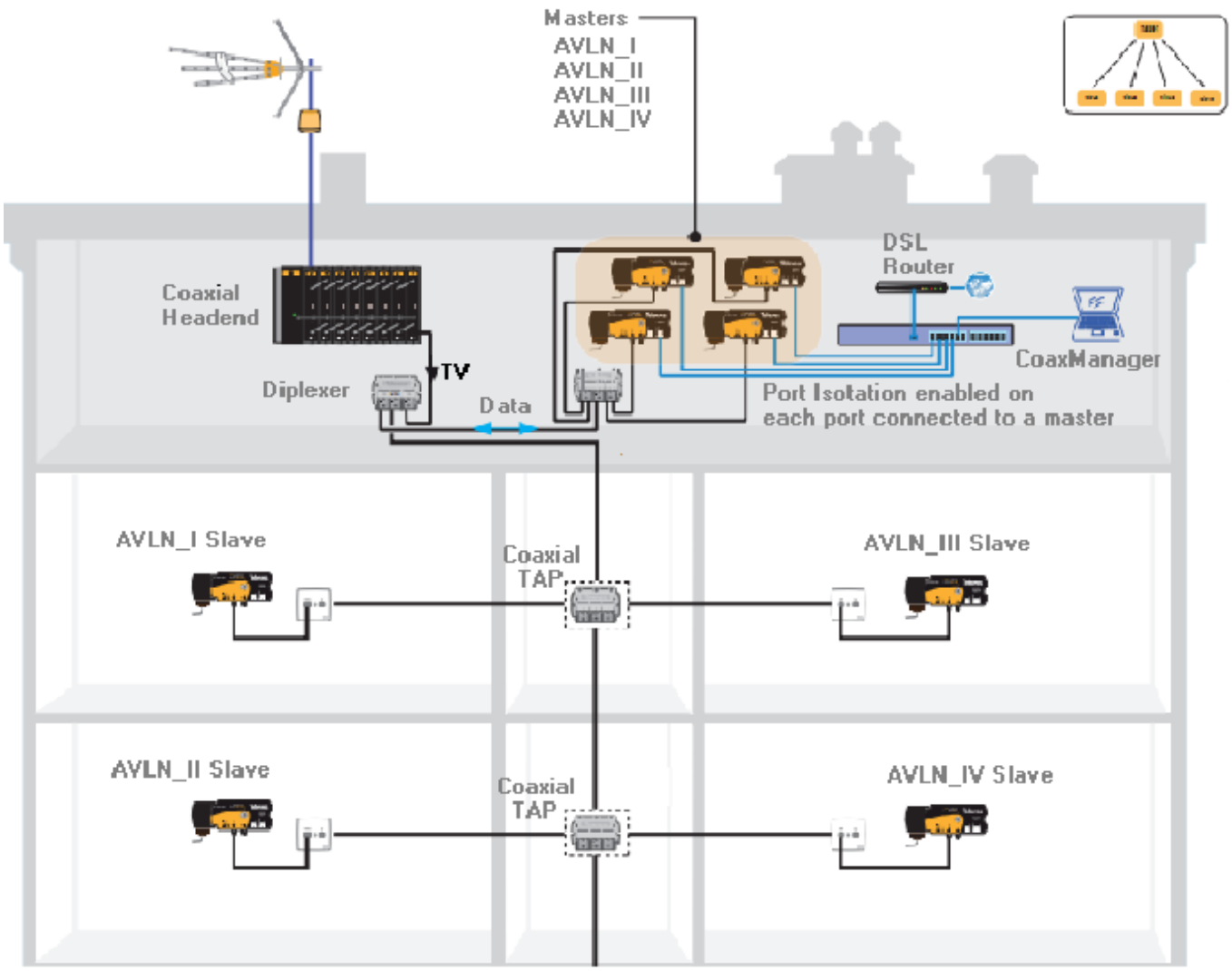
How to install multiple AVLNs on the same network coaxial cable

CoaxData allows the installation of up to four master in a header on same coaxial network that serves on a tree network topology.

Each of the networks managed by a master is a AVLN and identified by different network passwords. This network password is set by the program CoaxManager.

The password must be different in each of the masters (AVLNs), and each slave must be set with the master password with which the slave wants to communicate.

There is a limit to the maximum number of modems that can deliver a AVLN (1 master + 253 slaves). Using four modems teacher can increase the limit up modems slaves slaves 4x253 = 1012.



Up to 1012 slaves (4 AVLNs x 253) working on same coaxial cable

Professional and Special Applications

There are installations that require engineering support for the design and installation. Large distributions MATV / SMATV, CATVs small / medium, HFC (hybrid fiber / coaxial) unique Installations such as hotels, residences, schools, hospitals, cruise, security technology. For the creation of these systems professionals need to consider a set of common characteristics to ensure the quality of the installation.

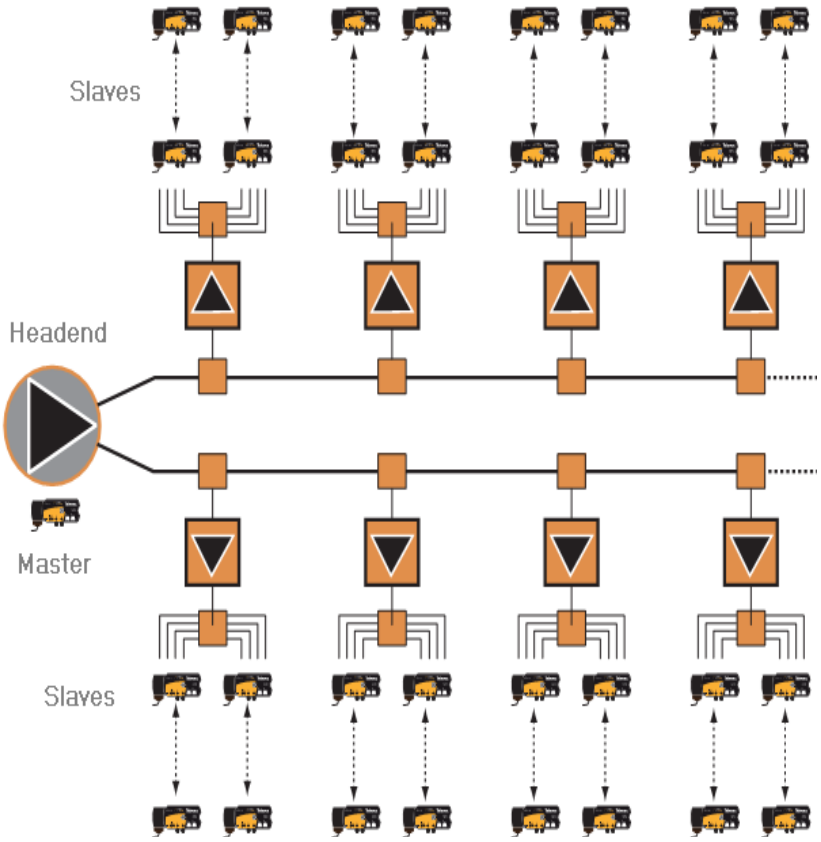
- **Line Amplifiers**

Its function is reamplified TV signal and have different characteristics that must be taken into account.

The transmission system, which is based CoaxData technology, works in the frequency range 2-30 MHz / 2 to 67,5 MHz, depending on the version, and as a bidirectional system generates signals from both of the slaves connected to the sockets as from master at the head.

This implies that in line amplifiers return channel should be passive in order to ensure its bidirectionality.

It will present an outline of installation where two modems are used (ref. 769 201) in a configuration called "repeater" allowing regenerate the data signal and increase the range of the network.



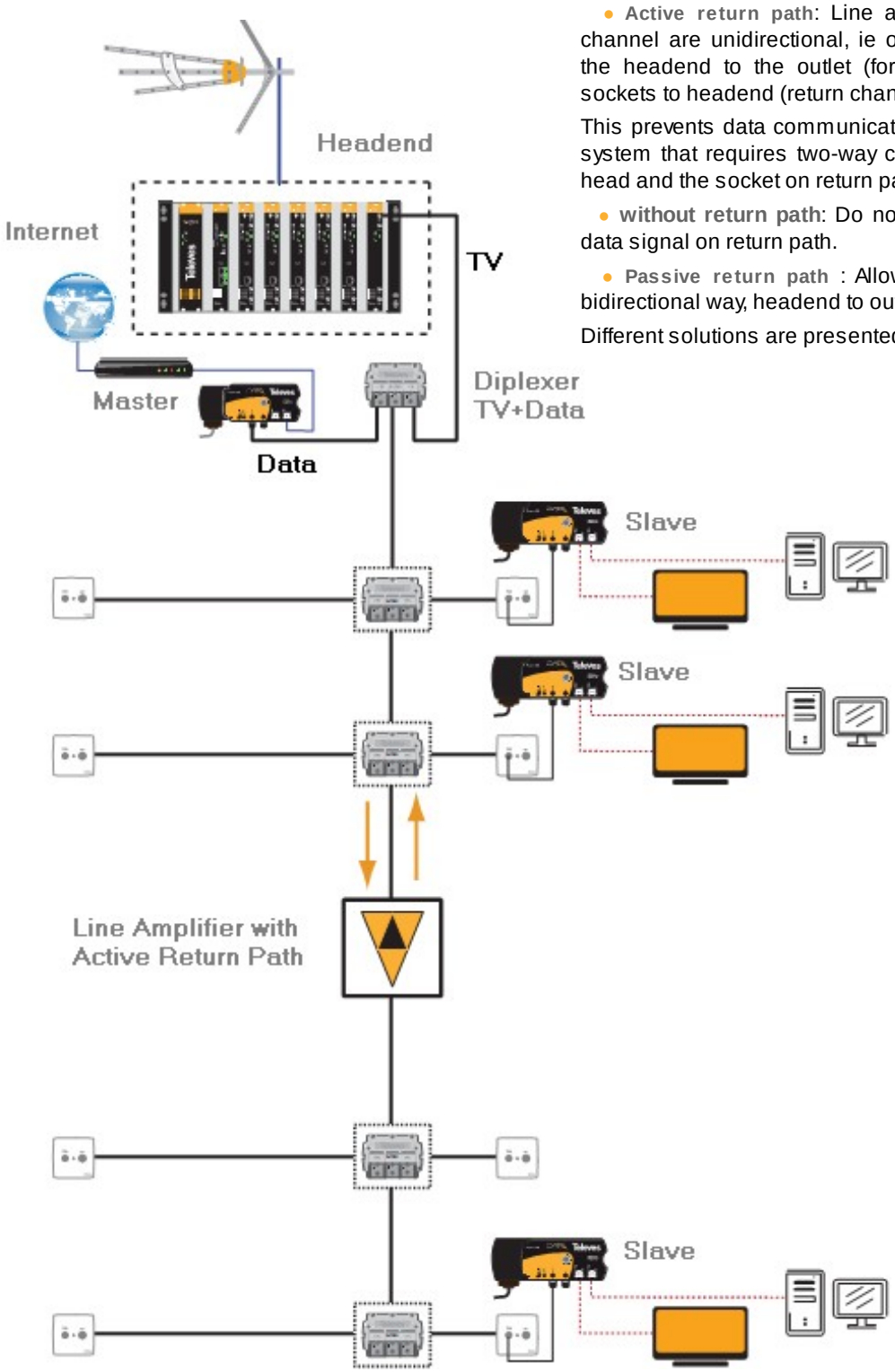
- **Large number of users and outlets**

The existence of a large number of outlets produces an increase of interfering noise in the return channel. This is significant noise in the head because the confluence of the noise contributions of the entire system

- **Devices on headend**

CATV networks are characterized by the existence of the header elements with high levels of signal, such as channel processors, modulators, etc. These items, if not filtered, can add noise in the return path of the network, generating a degradation in the quality of the links.

Professional Application - Types of Line Amplifiers



Amplifier Characteristics

In the presence of line amplifiers , you need to ensure the coexistence of the data network with these amps.

There are three types of amplifiers:

- **Active return path**: Line amplifiers with active return channel are unidirectional, ie only amplify the signal from the headend to the outlet (forward channel) or from TV sockets to headend (return channel).

This prevents data communication because CoaxData is a system that requires two-way communication between the head and the socket on return path.

- **without return path**: Do not allow transmission of the data signal on return path.
- **Passive return path** : Allows pass of data signal on bidirectional way, headend to outlet and viceversa.

Different solutions are presented below.

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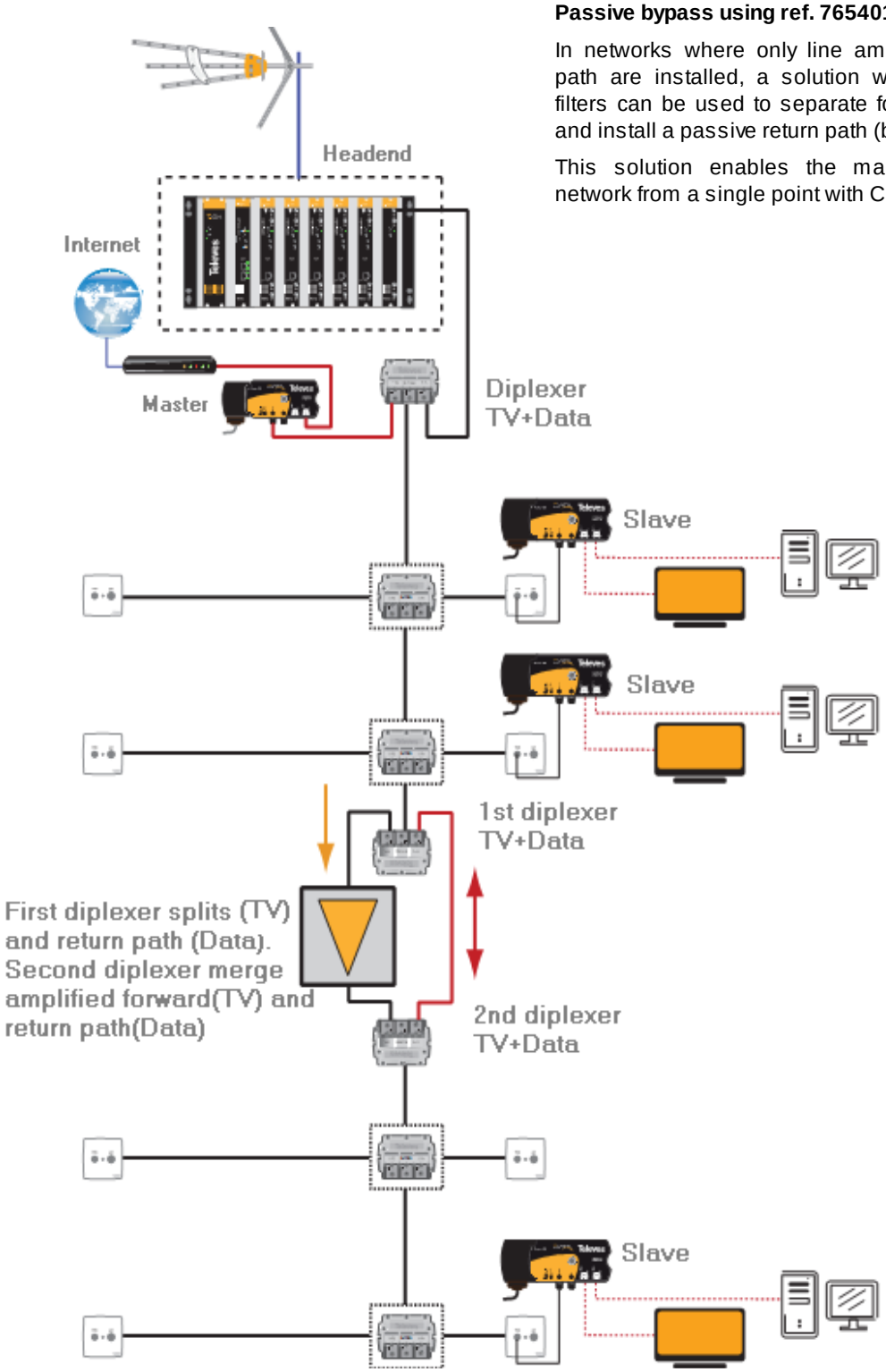
Line Amplifier - Passive Diplexer



Passive bypass using ref. 765401 diplexer filter

In networks where only line amplifiers with active return path are installed, a solution with two chained diplexer filters can be used to separate fordward and return paths and install a passive return path (bidirectional).

This solution enables the management of the entire network from a single point with CoaxManager.

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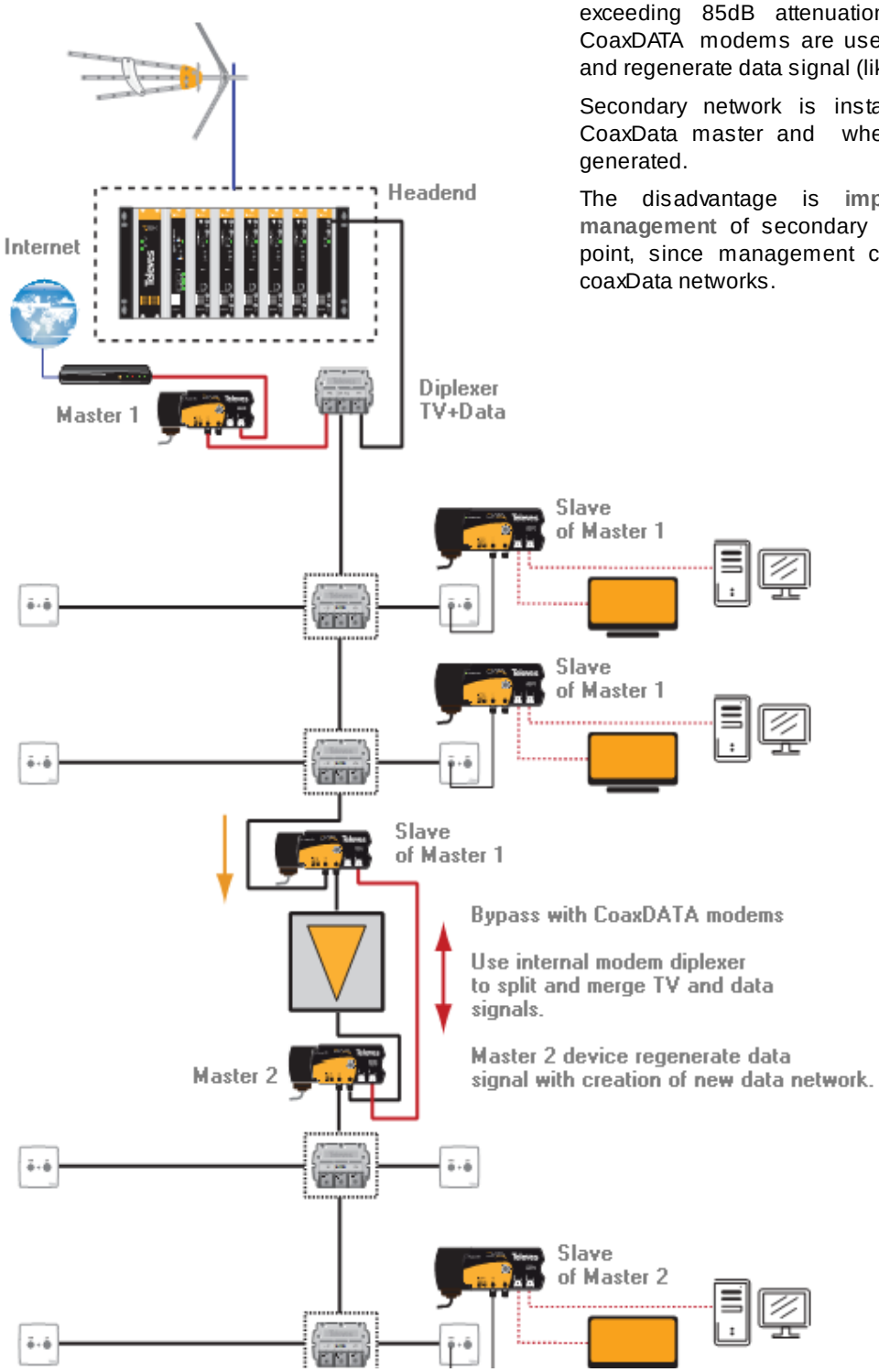
Line Amplifier- Diplexer using CoaxDATA



Bypass using a CoaxData modem

This configuration can achieve long distances, exceeding 85dB attenuation network, because CoaxDATA modems are used like signal repeaters and regenerate data signal (like line amplification).

Secondary network is installed with new added CoaxData master and where another network is generated.

The disadvantage is **impossibility of remote management** of secondary network from headend point, since management cannot bypass multiple coaxData networks.

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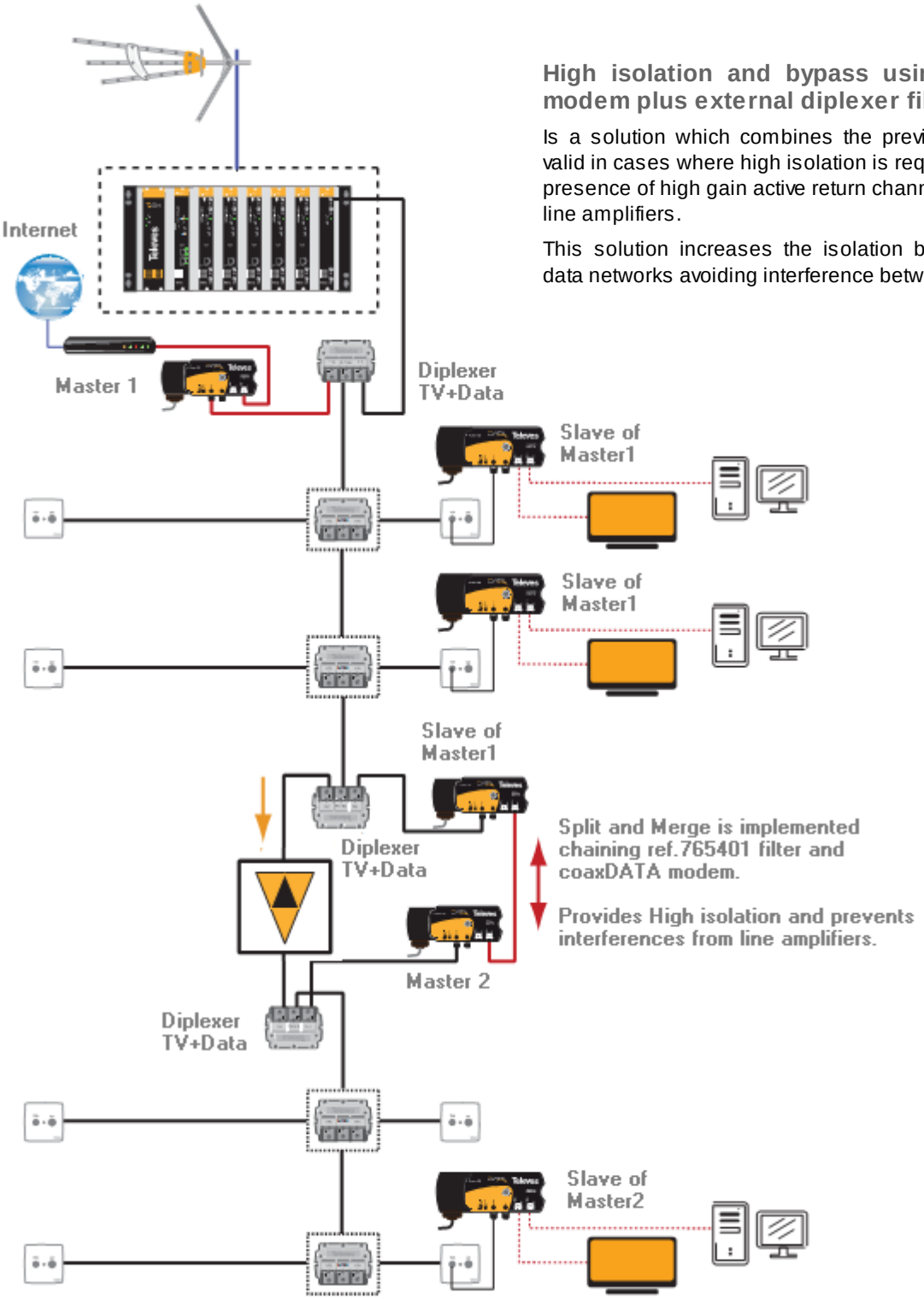
Line Amplifier - chaining diplexer filter and Coaxdata



High isolation and bypass using CoaxData modem plus external diplexer filter.

Is a solution which combines the previous two and is valid in cases where high isolation is required, due to the presence of high gain active return channel (amplified) in line amplifiers.

This solution increases the isolation between the two data networks avoiding interference between them.

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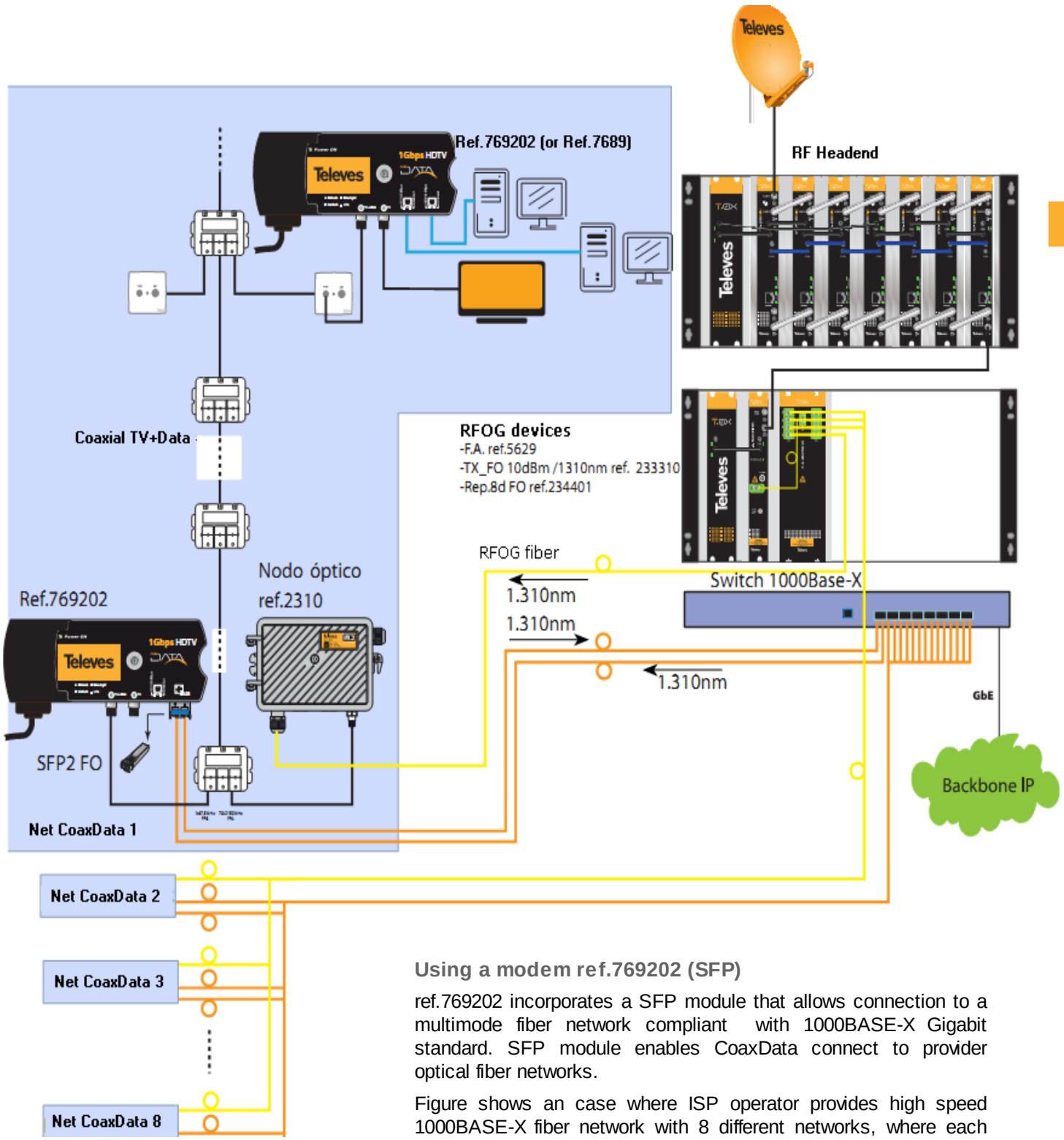
Coaxdata Gigabit with Ethernet over Optical Fiber 1000Base-X



Using a modem ref.769202 (SFP)

ref.769202 incorporates a SFP module that allows connection to a multimode fiber network compliant with 1000BASE-X Gigabit standard. SFP module enables CoaxData connect to provider optical fiber networks.

Figure shows an case where ISP operator provides high speed 1000BASE-X fiber network with 8 different networks, where each conduit is formed by three fibers, one for TV (RFOG) and two for data (for bidirectional transmission).

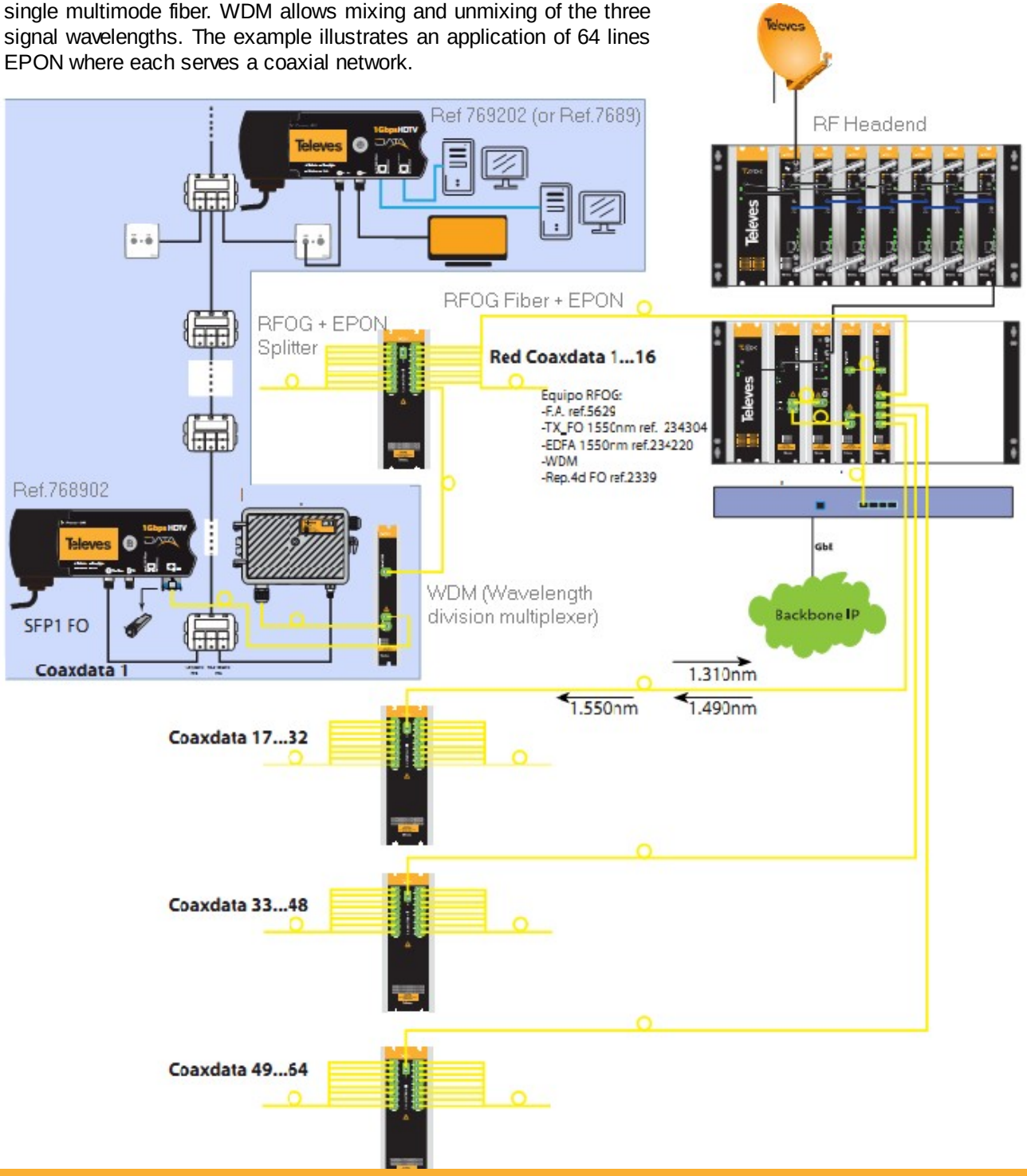
Coaxdata Gigabit and Ethernet over Passive Optical Networks (EPON)

EN

EPON Solution

On a single multimode, three wavelengths are used for multiplexing services. Bidirectional data link is performed on 1490/1310nm and television signal (RFOG) at 1550nm. This solution allows the distribution of the services on one fiberline infraestructure without the need of point-to-point architecture, and saves the economic waste in the fiber installation.

The SFP used must be compatible with bidirectional transmission of a single multimode fiber. WDM allows mixing and unmixing of the three signal wavelengths. The example illustrates an application of 64 lines EPON where each serves a coaxial network.



Troubleshooting

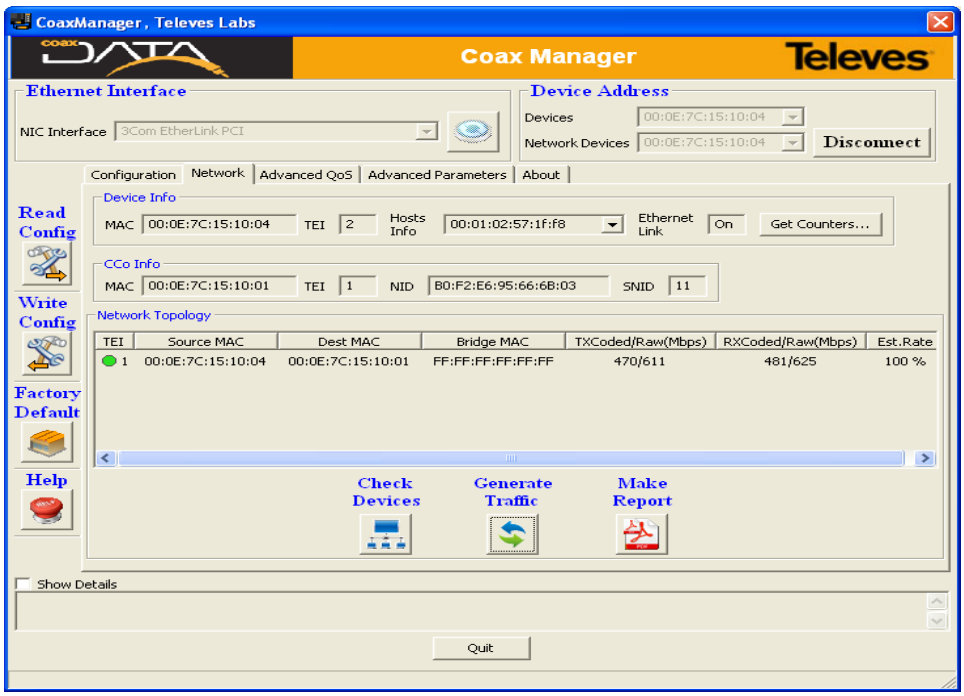
If you find problems in your network, check following points:

Check Network Status

Network Status can be check in two ways:

- **modem LEDs state:** The modem has two status LEDs: LED Medium: Only for Coaxial (Green) or Hybrid (Orange) and a link status LED: Connection Optima (Green), Normal (Orange) or poor (Red). Check the color of the LEDs to verify that the installation was successful, particularly if the status LED is light off no connectivity with any other device.

- **CoaxManager**: Connect the application CoaxManager to master device on headendand check the network includes all slave modems and link status is rigth. Check that you have correctly configured modems: MxU Mode/HomeNetworking, Master/Slave, Network Key ,...For questions about how to configure the modem See CoaxManager Manual.



In MxU Installations some modems don't appear

If any slave modem is installed fails or does not appear in the device list check the following assumptions:

- Verify slave modem is operating (CoaxManager can connect to) and leds are lighted (Coaxial/Hybrid led, link state led and Ethernet leds). Check led colours are right: green, red or orange.
- Verify slave modem is configured correctly and check that NPW (Network password key), transmission mode and transmission mask is set to appropriate values.
- Verify distance between master and slave farthest. Not recommended distances **greater than 1 km.**
- If you are using AccessControl™ Sofware or used it earlier in the installation, verify that the device is enable for transmissions. Please note that AccessControl can enable or disable device transmissions.

In MxU installations verify that there is only one master in the network

Verify that there is only one master in the network and that is installed in the head of your coaxial installation. The presence of more than one master modem in the network may cause system malfunction. Make sure there is only one master in the network.

You can check device configuration with CoaxManager™.

Verify that the return channel is available in whole coaxial network.

The return channel, which includes data operation bandwith 2 to 67,5 MHz, must be operating at whole coaxial network, and can send signals in a two direction; from downstream (head to sockets) and from upstream (sockets to headend).

Check the presence of line amplifiers with active return path channel. As far as possible, replace by amplifiers with passive return path or by a bypass with diplexer filters as shown in this manual.

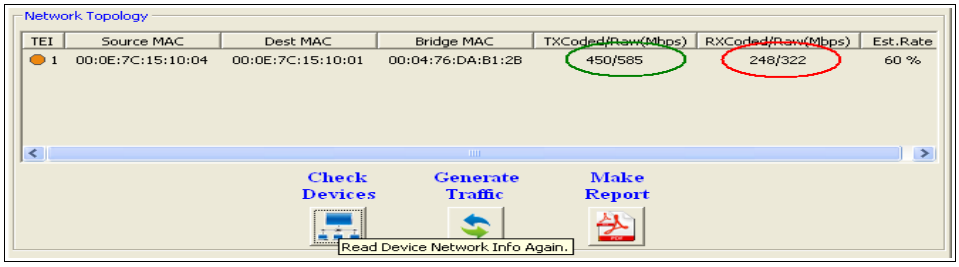
Consider all elements of coaxial network like outlets, taps or splitters and check support operating bandwith 2 to 65Mhz.

Check coaxial network attenuation on return path

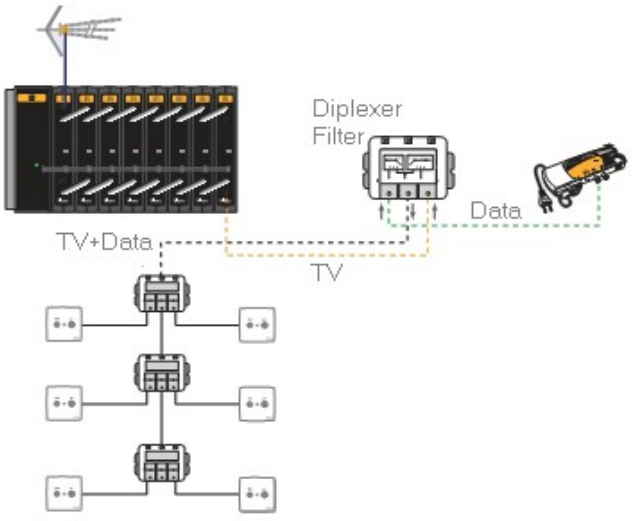
The attenuation between modems **should not exceed 85 dB** in the operating channel: 2 to 67,5 MHz; Calculate estimated attenuation and check that all the connections have been made properly. You can also use the application CoaxManager™ that can estimate attenuation between installed modems.

Filter TV signal on headend with diplexer

Check master links and If there is an asymmetry in the performance of the uplink and downlink; perhaps this is due to return path noise introduced by headend. This detection can be accomplished by querying the status of links in CoaxManager:



To avoid interference, it is recommended use filters diplexers that mixes data with TV signal, according the following scheme.



Technical Features

General

- IP Network Adapter to Coaxial infrastructure and Powerline.
- Modes HomeNetworking and MDU / MTU.
- **Up to 253 devices** per master in Mode MDU / MTU.
- Supports multiple masters, **up to 4**, on the same frequency. A total of **1012 devices.**
- Data Frequency Range: **2 to 67,5 MHz**
- TV Frequency range: **87-2150MHz**
- Maximum Attenuation: **85 dB**
- Output Signal: 130 dBuV
- Power spectral density: -50dBm/Hz
- Low Power spectral density: -135dBm/Hz
- Temperature range: -5 ° C to 45 ° C

Distance

- Coax Cable: **1.2Km**
- PowerLine: **300 m**

LED

- Led On/Off
- Medium: Detection half Coaxial / Hybrid
- LINK: Link Establishment and activity.
- 1000/100/10Mbps: Ethernet Link and Activity.

Estándares

- EEE 802.3 10BASE-T, 100BASE-TX, 1000BASE-T
- HomePlugAV IEEE P1901
- SFP with support for 802.3z 1000BASE-X

Modulación y Codificación de Canal

- **Dynamic adaptation** to channel conditions and frequency synchronization with the PLC network 50/60Hz
- **2880 OFDM carriers**, QAM 4096/1024/256 / 64/16/8, QPSK, BPSK and ROBO mode.
- Automatic error correction based on **FEC** (forward error correction) and **TCC** (Turbo Convolutional Codes)

QoS

- Supports Multicast. IGMP snooping. MLDv2/IGMPv3 / IGMPv2.
- Four transmission queues prioritized.
- VLAN IEEE 802.1p prioritization
- Type of Service (ToS) and COS (Class of Service)
- Source/Destination MAC Address Classifier.
- Source / Destination IP Address Classifier.
- Other adjustable classifiers filters.

AC and Consumption

- 108V-254V~ 50/60Hz
- Consumption: Max 6 Watts
- **Low Power Mode (Advanced Power Management) Max 1.8Watts**

Metodos de Transferencia

- **HomeNetworking**: Asynchronous mode based on CSMA / CA with low latencies.
- **MxU**: Token-based synchronous mode (Hidden Node) which synchronizes slave transmissions and supports long distances.

Security

- Establishment of private networks using network key (**NPW**, Network Password key)
- Privacy of communications using AES-128 encryption (**NEK**, Network encrytion key)
- Privacy settings on devices using AES-128 access key (**NVAK**, Non-Volatile Access key)

Connectors

- Electric cable EURO
- 2 x"F" Connectors 75 Ohm, low pass filter to the data (2 to 67,5 MHz) and high-pass filter for TV Services (87MHz-2150MHz).
- 2xRJ45 ports for 1000/100/10Mbps.Auto Ethernet MDI / MDIX.

Normative

- Compact Design, robust and shielded that meets all applicable regulations.
- UNE-EN 60950-1:2007 / AC: 2012: product safety
- UNE-EN 55022:2008 Radio Interference
- UNE-EN 55024:2011 immunity requirements
- UNE-EN 50412-2-1:2006 Immunity requirements for low voltage installations for communications equipment over powerline.

ES

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